Case Study No. 21 Waterborne Coatings
Schrock Cabinets
Grants Pass, OR

Background

Schrock's Grants Pass plant has about 150 manufacturing employees. The manufacturing process at Grants Pass is similar to Schrock's other facilities. However, because this facility manufactures a specialty product line, cabinets from the Grants Pass plant are not mixed with cabinets from other Schrock facilities. The primary woods used for the cabinets are alder, oak, and maple.

The Grants Pass facility is not located in an ozone nonattainment area but is located within 100 miles of a designated Class I area. Under their Oregon permit, the facility has a cap on their annual VOC emissions. The facility also is subject to the Wood Furniture NESHAP.

Schrock Cabinets has made a corporate commitment to reduce their VOC and HAP emissions through the use of low-VOC and low-HAP coatings. The facilities in Hillsboro and Grants Pass, Oregon, are well below their State-imposed VOC limits and both met the HAP limits included in the Wood Furniture NESHAP months before the compliance date. While meeting the regulatory requirements was a primary driver in the decision to convert to a hybrid waterborne coating system, the company has moved beyond what is required by the regulations because of their commitment to the environment.

Manufacturing and Coating Operations

Cabinet doors are purchased premade from several different vendors. Cabinet components are finished on a hanging line. In a typical finishing sequence, one coat each of stain, sealer, and topcoat are applied, although two coats of stain or two coats of sealer are used for some applications. Stains are applied with HVLP spray guns, and sealer and topcoat are applied with air-assisted airless guns. All cabinets are finished and then assembled. The finishing line runs at about 26 feet per minute and production is about 500 cabinets per day. The majority of the facility's coatings are supplied by Akzo.

Conversion to Waterborne Coatings

The Grants Pass facility began online testing of waterborne stains in July 1996. In November 1996, the plant began using waterborne stains full-time. To date, the conversion to waterborne stains has been a success. In many cases, the waterborne stains actually provide a richer color than the solvent-borne stains used previously. The cost of the waterborne stains is 5 to 25 percent less than the solvent-borne stains.

Most of the testing of the waterborne stains focused on ensuring that the color of products finished with the waterborne stains was the same as the color of products finished with the solvent-borne stains. Although the facility's products are not mixed with products from other plants, which makes the color matching process easier, it is still important that the color match that of previous product lines. Schrock successfully converted to the waterborne coatings without sacrificing product quality. The color achieved with the waterborne stains used at the Grants Pass facility is richer than the color achieved with the solvent-borne stains.

The other issue with waterborne stains is grain raise. Schrock has found that surface preparation is the key to overcoming this problem. It is important to sand the product well before staining to rid the surface of as much fiber as possible. After staining, the parts are sanded again. Because of the grain raise, some parts, particularly those made of alder or veneers, receive two coats of sealer.

With the solvent-borne stains, the parts were wiped after the stain application. The facility has found that their waterborne stains work best without wiping. The facility was able to continue to use the same sealer and topcoat formulations that they used with the solvent-borne stains until they made the conversion to waterborne topcoats.

Unlike waterborne sealers and topcoats, waterborne stains do not require coalescing solvents. Therefore, the VOC content of the waterborne stains is very low. Facility personnel indicated that the waterborne stains used at the Grants Pass facility have a VOC content of about 0.01 pound VOC/pound solids.

The Grants Pass facility also conducted testing of waterborne topcoats. They found that the topcoat is not completely cured by the time it comes off the finishing line, so the finished pieces stick together if stacked on top of each other. They place the finished parts in a rack until the topcoat is completely cured, but plan to extend the finishing line and add a drying oven to cure the topcoat more quickly. Lengthening the finishing line will cost the facility about $200,000.

Costs

The cost of converting to waterborne stains has been minimal. Some labor and material costs were incurred during testing, but the waterborne stains are actually less expensive, in most cases, than the solvent-borne stains. The facility already had stainless steel lines in place. Labor costs are higher with the waterborne stains. The facility was able to eliminate a wiper because the waterborne stains do not have to be wiped, but they have added sanders because of the grain raising problem. The net increase in labor is about 1.5 people.

The primary cost involved in the conversion to waterborne topcoats is the pieces that must be reworked due to finishing defects. The planned modifications to the finishing

line also are a significant cost. The waterborne topcoats cost more than the solvent-borne topcoats used previously, but they have a higher solids content than the solvent-borne topcoats.

Emissions

The Grants Pass facility is well below their VOC emissions cap and meets the HAP limits under the Wood Furniture NESHAP. According to data supplied by the facility, when they were applying a full solvent-borne system, they averaged 5.03 pounds of VOCs per gallon. With the hybrid waterborne system, they average 3.09 pounds of VOCs per gallon, a reduction of almost 40 percent. The facility can increase production significantly and still keep their emissions under the VOC cap.